

**Amendments to the Claims**

Claims 1-16 (Canceled).

Claim 7 (Withdrawn). A system for direct digitally encoding a data signal for impulse radio communications, comprising:

an impulse radio transmitter having an encoder that direct digitally encodes the data signal to produce a direct digitally encoded data signal; and

an impulse radio receiver having a decoder and a phase-locked loop, wherein said direct digitally encoding avoids errors in the phase-locked loop.

Claim 8 (Withdrawn). The system of claim 7, wherein said encoder comprises a return-to-zero encoder.

Claim 9 (Withdrawn). The system of claim 7, wherein said encoder comprises one of a pseudo Manchester encoder, a frequency shift keying encoder, an n-ary phase modulation encoder and a phase amplitude modulation encoder.

Claims 13-18 (Canceled).

Claim 19 (Withdrawn). A method for receiving impulse radio signals, comprising:  
cross correlating a received impulse radio signal with a decode signal to output a baseband signal; demodulating the baseband signal to output a subcarrier signal; and

demodulating the subcarrier signal to output an information signal.

Claim 20 (Withdrawn). The method according to claim 19, wherein said demodulating the baseband signal step comprises direct digitally demodulating the baseband signal to output the subcarrier signal.

Claim 21 (Withdrawn). The method according to claim 20, wherein said step of direct digitally demodulating further comprises pseudo Manchester decoding.

Claim 22 (Withdrawn). The method according to claim 19, further comprising: lowpass filtering the baseband signal to output an error signal; and adjusting a periodic timing signal using the error signal to time position the decode signal in relation to the position of the received impulse radio signal thereby optimizing the cross correlation.

Claim 23 (New). A transmitter, said transmitter comprising:

- (a) an output stage that generates an ultra wideband signal;
- (b) a filter that spectrally modifies said ultra wideband signal; and
- (c) an antenna coupled to said filter that radiates said spectrally modified ultra wideband signal.

Claim 24 (New). The transmitter of claim 23, wherein said ultra wideband signal comprises at least one of a pulse, a cycle, or a monocycle.

Claim 25 (New). The transmitter of claim 23, wherein said filter is a bandpass filter.

Claim 26 (New). The transmitter of claim 25, wherein said bandpass filter creates one or more zero crossings in the time domain.

Claim 27 (New). The transmitter of claim 23, wherein said output states generates said ultra wideband signal based upon a trigger signal.

Claim 28 (New). The transmitter of claim 27, wherein said trigger signal is applied to at least one switch.

Claim 29 (New). The transmitter of claim 28, wherein said at least one switch comprises at least one transistor.

Claim 30 (New). The transmitter of claim 27, wherein said trigger signal is based on at least one of an information signal, a code signal, and a subcarrier signal.

Claim 31 (New). A method of transmitting, comprising:

- (a) generating an ultra wideband signal;
- (b) spectrally modifying the ultra wideband signal; and
- (c) radiating the spectrally modified ultra wideband signal.

Claim 32 (New). The method of claim 31, wherein said ultra wideband signal comprises at least one of a pulse, a cycle, or a monocycle.

Claim 33 (New). The method of claim 31, wherein a filter is used to spectrally modify the ultra wideband signal.

Claim 34 (New). The method of claim 33, wherein said filter is a bandpass filter.

Claim 35 (New). The method of claim 31, wherein said spectrally modifying creates one or more zero crossings in the time domain.

Claim 36 (New). The method of claim 31, wherein said generating an ultra wideband signal is based on a trigger signal.

Claim 37 (New). The method of claim 36, wherein said trigger signal is applied to at least one switch.

Claim 38 (New). The method of claim 37, wherein said at least one switch comprises at least one transistor.

Claim 39 (New). The method of claim 36, wherein said trigger signal is based on at least one of an information signal, a code signal, and a subcarrier signal.

Claim 40 (New). A method of transmitting, comprising:

- (a) generating an ultra wideband signal;
- (b) filtering the ultra wideband signal; and
- (c) radiating the filtered ultra wideband signal.

Claim 41 (New). The method of claim 40, wherein said filter is a bandpass filter.

Claim 42 (New). The method of claim 40, wherein said generating an ultra wideband signal is based on a trigger signal.